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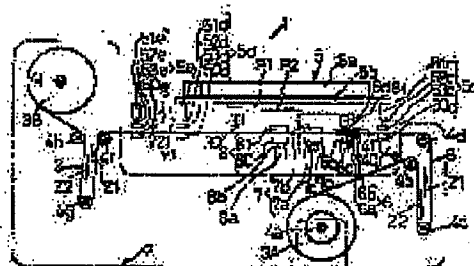
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## (54) DEVICE FOR FORMING RESIN TAPE

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To form an indent without using a press die, and ensure a high product yield by maintaining the die precision over a long period of time by a method wherein a long-sized resin tape is intermittently driven, and only a part to be processed is heated when the resin tape is stopped, and a pressurizing process is performed with a pressurized fluid toward the inside of the female die.

**SOLUTION:** A long-sized resin tape 3 is carried to a heating device 6 by an intermittent driving part 5 of a tape forming device 1. When the tape 3 is stopped under a state wherein the tape 3 exists in the heating device 6, the heating device 6 heats only a part of the tape 3, which becomes a process objective to soften it. Then, the softened process objective part is carried to a processing device 7 being next to the heating device 6 at the next carrying. At the same time, a new process objective part of the tape 3 is carried to the heating device 6 and stops. The processing device 7 is equipped with a female die part which is the same shape as the shape of an indent which is the target of the process, and forms the target indent by jetting a pressurized fluid into the female die through the process objective part which has been heated softened by the heating device 6.



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**CLAIMS**

[Claim(s)]

[Claim 1]Molding equipment of a resin tape characterized by comprising the following.

An intermittent driving part which conveys a resin tape of long shape which is a processing object, and is stopped.

A processing device which carries out plastic working of the portion which was located behind heating apparatus which heats only a machining part at the time of a stop, and this heating apparatus, and was heated at the time of a stop, and becomes depressed, or forms a projection.

[Claim 2]Molding equipment of the resin tape according to claim 1 whose heating apparatus is a heating plate of a machining part heated in contact with the whole surface at least.

[Claim 3]Molding equipment of the resin tape according to claim 2 in which a contact surface of a heating plate is formed by felt, heat-resistant resin, etc.

[Claim 4]Molding equipment of the resin tape according to claim 1 which is a device to which heating fluid in which heating apparatus was heated by machining part, such as a steam and gas, is contacted.

[Claim 5]Molding equipment of the resin tape according to claim 1 which is a device with which heating apparatus irradiates a machining part with electromagnetic waves.

[Claim 6]Molding equipment of the resin tape with a concave which a processing device countered either one of [ which was heated ] the whole surface of a portion, or other sides, and has been arranged, and a pressurization part which pressurizes either one of this whole surface or these other sides with pressurized fluid toward inside of this concave according to claim 1.

[Claim 7]Molding equipment of the resin tape with a decompressing part which decompresses inside of a concave which a processing device countered either one of [ which was heated ] the whole surface of a portion, or other sides, and has been arranged, and this concave according to claim 1.

[Claim 8]Molding equipment of the resin tape possessing a punching device which pierces a portion by which was located behind a processing device and plastic working was carried out at the time of a stop according to claim 1.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention]The resin tape of the long shape in which many hollows for this invention to accommodate garbage, such as precision electronic components and precision autoparts, and the precision component which dislikes humidity were formed. It is related with the molding equipment of the resin tape for manufacturing what is called an embossed carrier tape, and the molding equipment of the resin tape which can pierce closed-end parts with a hollow continuously from the resin tape of the long shape in which many hollows were formed.

[0002]

[Description of the Prior Art]The conventional manufacturing installation which manufactures an embossed carrier tape was processed into the resin tape of long shape with the press device provided with the press die (a female die and male) for forming the hollow of the shape made into the purpose. The conventional manufacturing installation which manufactures closed-end parts with a hollow was processed with the press device provided with the press die (a female die and male) for forming the closed-end parts which the target shape became depressed and it had from the resin tape of long shape.

[0003]

[Problem(s) to be Solved by the Invention]The following faults are generated when manufacturing an embossed carrier tape by a press die (a female die and male) using said press device. Namely, since (1) female die and a male are needed, facility cost is high.

(2) On the other hand, pinch a side in an instant mechanically with a female die and a male the side side of the resin tape of long shape, and in order to carry out plastic shaping, rub a female die and a male via a tape, exhaust them by long-term use, and mold accuracy falls.

[0004]this fault with a low yield of a product is [ that it is easy to make the die surface (an outside surface and an inner surface) of the hollow formed in the tape generate a crack, a crack, etc. ] deep — becoming depressed (deep-drawing shape) — it becomes remarkable when it is considered as a complicated variant hollow. For this reason, it is limited to shaping of a shallow hollow or \*\*\*\*\*. Said press device is used independently, and also when manufacturing the closed-end parts which have a hollow from the resin tape of long shape by the press die (a female die and male), the fault of the aforementioned (2) statement is generated.

[0005]This invention was made in view of said situation, and can form a hollow in the resin tape of long shape, without using the conventional press die (a female die and male). And cost is low, and as for long-term use, the rate [ exhausting ] of a female die is low, can be stabilized over a long period of time in mold accuracy, and let it be a technical problem to provide the molding equipment of the resin tape which can obtain a high product yield.

[0006]

[Means for Solving the Problem]An invention of claim 1 and molding equipment of a resin tape are provided with the following.

An intermittent driving part which conveys a resin tape of long shape which is a processing object, and is stopped.

Heating apparatus which heats only a machining part at the time of a stop.

A processing device which carries out plastic working of the portion which was located behind this heating apparatus and heated at the time of a stop, and becomes depressed, or forms a projection.

[0007]In said claim 1, heating apparatus of an invention of claim 2 and molding equipment of a resin tape is a heating plate of a machining part heated in contact with the whole surface at least. As for an invention of claim 3, and molding equipment of a resin tape, in said claim 1, a contact surface of a heating plate is formed by felt, heat-resistant resin, etc. An invention of claim 4 and molding equipment of a resin tape are devices to which heating fluid heated by machining part, such as a steam and gas, is contacted in said claim 1.

[0008]An invention of claim 5 and molding equipment of a resin tape are devices with which heating apparatus irradiates a machining part with electromagnetic waves in said claim 1. An invention of claim 6 and molding equipment of a resin tape have a concave which a processing device countered either one of [ which was heated ] the whole surface of a portion, or other sides, and has been arranged, and a pressurization part which pressurizes either one of this whole surface or these other sides with pressurized fluid toward inside of this concave in said claim 1.

[0009]An invention of claim 7 and molding equipment of a resin tape have a decompressing part which decompresses inside of a concave which a processing device countered either one of [ which was heated ] the whole surface of a portion, or other sides, and has been arranged, and this concave in said claim 1. An invention of claim 8 and molding equipment of a resin tape possess a punching device which pierces a portion by which was located behind a processing device and plastic working was carried out at the time of a stop in said claim 1.

[0010]

[Embodiment of the Invention]The molding equipment (a tape manufacturing installation is called hereafter) of the resin tape of claim 1, As the precision electronic components used at the impression plaster place which mass-produces electronic equipment, precision autoparts, etc., a capacitor, resistance, an IC chip, etc. are used, when manufacturing conveyance and the embossed carrier tape beforehand accommodated so that it may supply or may be easy to carry out with a group etc.

[0011]And the predetermined number of the resin tapes (a tape is called hereafter) of the long shape which is a processing object is repeated by turns by the intermittent driving part of a tape manufacturing installation in conveyance and a stop. Said tape is first conveyed by heating apparatus at the time of conveyance which made the intermittent driving part drive. Subsequently, an intermittent driving part shifts to heating apparatus at the time of a stop, after the tape has existed. Then, heating apparatus heats only the portion used as the processing object of a tape. The processing object portion of a tape is heated and is softened. And said softened processing object portion is conveyed by the processing device behind heating apparatus at the time of the next conveyance, and simultaneously with the method of -, and this, after the new processing object portion of a tape is conveyed by heating apparatus, it shifts to it at the time of a stop. With a processing device, the processing object portion (said portion heated and softened) located in the processing device at the time of this stop is heated by heating apparatus, and softens the new processing object portion of the tape where plastic working is carried out and a hollow is formed and which is in a halt condition in a heating apparatus position simultaneously with the method of -, and this.

[0012]Namely, a tape at the time of the stop of an intermittent driving part. While the processing object portion which heating apparatus and a processing device synchronize, and operates, and exists in a heating apparatus position is heated and being softened, in the processing object portion (said portion heated and softened) which exists in a processing equipment location, plastic working is carried out and a hollow is formed. The state which can resume the next conveyance where it stopped temporarily is called the time of the stop of an intermittent driving part between the times of conveyance for conveying a tape intermittently, and the next conveyance.

[0013]Said intermittent driving part can control a drive by numerical control. In this case, the

adjustment which is variously set as the transportation quantity and the bearer rate of a tape suitable for the process conditions (for example, the pitch of each different hollow for every kind of hollow formed in a tape, the shape of a hollow, etc.) of a tape, or is changed becomes easy. The heating plate used as said heating apparatus has a heater which generates heat by impressing current in an inside. This heater adjustment and is controllable in 100 \*\* - 250 \*\* in the skin temperature of the contact surface which contacts the tape of a heating plate. Said skin temperature should be suitable for the kind of construction material of a tape. One which can be heated in contact with the whole surface or both sides of a portion used as the processing object of a tape, or 2 can be used for a heating plate.

[0014]A heating plate has a driving source which carries out reciprocation moving in the direction which approaches and secedes from the contact surface to a tape so that it may be held at a tape and a noncontact state at the time of conveyance of the tape by an intermittent driving part and may be held at a tape and a contact state at the time of conveyance and the stop repeated by turns. As said driving source, an air cylinder apparatus, a hydraulic cylinder device, a servo motor, etc. can be used, for example.

[0015]The contact surface heated in contact with the tape of a heating plate can contact a tape soft by being formed by felt, heat-resistant resin, etc. In said heat-resistant resin, since a tape is prevented from carrying out hot welding of said heating plate to a contact surface when the thermally conductive good raw material of aluminum, brass, etc. is used for example, it can be considered as said aluminum and the contact surface which coated the surface of the heating plate made from \*\*\*\*\* with the fluoro-resin.

[0016]As heating apparatus, in using the device which irradiates the portion used as the processing object of a tape with the device or electromagnetic waves on which the heated heating fluid, such as a steam and gas, is contacted, the portion used as the processing object of a tape can be heated even to a predetermined temperature by a noncontact state, and it is useful for crack prevention. The concave of a processing device is the thing provided with the crevice of the same shape as the hollow shape made into a processing purpose, and in order to improve machining efficiency, it is provided with two pieces - eight crevices two or more.

[0017]The pressurization part of a processing device spouts pressurized fluid toward the inside of said concave via the portion used as the processing object of the tape heated by said heating apparatus. As said pressurized fluid, compressed air, a heat-of-compression fluid, etc. can be used. Being able to set up the pressure of said pressurized fluid in the range of  $1 \text{ kg/cm}^2 - 9 \text{ kg/cm}^2$ , desirable ranges are  $5 \text{ kg/cm}^2 - 9 \text{ kg/cm}^2$ .

[0018]The decompressing part which decompresses the inside of a concave can be used for a processing device instead of said pressurization part. The vacuum pump which each concave crevice was made to open for free passage can be used for a decompressing part, for example. The pressure of said pressurized fluid and the decompression value in a concave can be variously set up according to the thickness and construction material of a tape used as a processing object, the shape by which plastic working is carried out, the size of the shape, etc.

[0019]Said pressurization part and said decompressing part can be simultaneously used for a processing device. In this case, since it decompresses from a side on the other hand while pressurizing a tape from the whole surface side, time to form a hollow in a tape can be shortened. As for said concave, it is preferred to have a means for cooling itself. In order to contact the surface of a concave crevice for every time of processing which a tape becomes depressed along a concave crevice as this reason, and is formed in shape, If the heat of the tape heated with said heating apparatus is transmitted and accumulated in a concave and temperature becomes high, in contact with the surface of the crevice of the elevated temperature at the moment where the tape was once formed in hollow shape, the hollow shape which carries out heat modification and has the target dimensional accuracy in said hollow shape and different shape will not be obtained.

[0020]Therefore, a concave becomes depressed by cooling to the temperature requirement from which said heat modification is not started with air cooling, water cooling, etc., and can improve the yield of shape. The punching device can pierce from a tape the portion to which plastic

working of the tape was carried out by the processing device of that previous process as one product (parts), or it can pierce it in order to carry out hole down of the pars basilaris ossis occipitalis of said portion by which plastic working was carried out to predetermined shape in front of this punching process.

[0021]The 1st punching device that is located in order behind a processing device, respectively, and pierces a hole at the pars basilaris ossis occipitalis of a hollow as a punching device at the time of a stop, for example, Two punching devices with the 2nd punching device pierced as closed-end parts which have \*\* from the resin tape of long shape are used, Two operations of the operation pierced as closed-end parts with \*\* can be performed at the pars basilaris ossis occipitalis of a hollow using one punching device from the resin tape of the operation which pierces a hole, and long shape.

[0022]a hole — the 1st punching device for carrying out dawn, The pars-basilaris-ossis-occipitalis hole dawn convex shape installed in the position which counters the pars-basilaris-ossis-occipitalis hole dawn concave and pars-basilaris-ossis-occipitalis hole dawn concave which carry out relative displacement to the position which separated approach and a predetermined interval mutually, A pars-basilaris-ossis-occipitalis hole dawn concave and a pars-basilaris-ossis-occipitalis hole dawn convex shape are consisted of an actuator for making the toggle mechanism and toggle mechanism for [ said ] carrying out relative displacement drive.

[0023]A pars-basilaris-ossis-occipitalis hole dawn concave and a pars-basilaris-ossis-occipitalis hole dawn convex shape carry out hole dawn of the pars basilaris ossis occipitalis of the hollow shape of the tape formed by said processing device to predetermined shape. That is, the pars-basilaris-ossis-occipitalis hole dawn concave is provided with the pars-basilaris-ossis-occipitalis hole dawn crevice of the same shape as the concave crevice of said processing device except having a hole of said shape in an inner bottom. the hole make reciprocation moving of the \*\*\*\* of reciprocation moving is possible for a pars-basilaris-ossis-occipitalis hole dawn convex shape via the hollow shape of said tape to a pars-basilaris-ossis-occipitalis hole dawn concave, and possible to the hole formed in the undersurface in said inner bottom of the pars-basilaris-ossis-occipitalis hole dawn concave — it has the dawn projected part.

[0024]An air cylinder device, a hydraulic cylinder device, a linear motor, etc. can be used for an actuator. It is preferred that it is advantageous at a cost aspect and to use an air cylinder device, since it can miniaturize. After accommodating the hollow shape of a tape in the crevice of a pars-basilaris-ossis-occipitalis hole dawn concave, the whole surface side and the rear part which is pinched from a side on the other hand, and carries out fixed holding to the regular position are formed in the periphery [ of the crevice of a pars-basilaris-ossis-occipitalis hole dawn concave ], and periphery side of the heights of a pars-basilaris-ossis-occipitalis hole dawn convex shape in the tape of the hollow-shaped peripheral wall. The tubed strip artist stationed in the shape of the same axle (concentric circle shape) at the periphery side of the heights of a convex shape, for example can be used for a rear part.

[0025]The number of a pars-basilaris-ossis-occipitalis hole dawn concave and a pars-basilaris-ossis-occipitalis hole dawn convex shape is set as the same thing as the number of the concave crevice of said processing device. The thing of the hollow shape which equipped with the hole of predetermined shape the pars basilaris ossis occipitalis formed by said 1st punching device as said 2nd punching device is used as item parts, The punching concave and the punching convex shape, the concaves and the punching convex shapes, and both these molds for becoming depressed from a tape and separating by a shearing action in the periphery separation position of shape are consisted of an actuator for making the toggle mechanism and toggle mechanism for [ said ] carrying out relative displacement drive.

[0026]It is almost the same as said pars-basilaris-ossis-occipitalis hole dawn concave and a pars-basilaris-ossis-occipitalis hole dawn convex shape except having considered it as the punching concave of shape and punching convex shape which were set as the clearance where it can pierce with a punching concave and the convex shape can obtain said shearing action both these types of in between. The periphery side cylinder-like heights in which the punching convex shape can accomplish a shearing action by a punching concave, The inner circumference guiding shaft part which inserts in as guidance the hole which is arranged at the inner circumference

side of periphery side cylinder-like heights, becomes depressed just before performing said shearing action, and is formed in the pars basilaris ossis occipitalis of shape. It consists of a tubed strip artist who separates a predetermined interval to the periphery side of periphery side cylinder-like heights, is stationed in the shape of the same axle (concentric circle shape), and is stationed at the periphery side of a concave crevice, and pinches hollow-shaped surrounding tape parts by a concave.

[0027]The same thing as the case of said 1st punching device can be used for a toggle mechanism and an actuator.

[0028]

[Example]

(Example 1) Example 1 of the molding equipment of this invention and a resin tape is described based on drawing 1 - drawing 6. The molding equipment 1 of the resin tape of Example 1 shown in drawing 1. The base 2 and the maintenance pivot 4a which supports pivotally the delivery reel 3A which was equipped with or held in the base 2, respectively, and carried out specified quantity winding of the resin tape (a tape is called hereafter) 3 of long shape. The driving shaft 4i which drives the take up reel 3B which rolls round the processed tape 3. The 1st guidance roll 4b installed in the course between the maintenance pivot 4a and the driving shaft 4i in order, respectively. The 1st tension grant roll 4c, the 2nd guidance roll 4d, and the intermittent driving part 5. It is constituted by the guiding slit part 4e, the heating apparatus 6, the hollow processing device 7, the sending hole processing device 8, the 3rd clamp part 5e, the 3rd guidance roll 4f, the 2nd tension grant roll 4g, and the 4th guidance roll 4h. The base 2 attaches the angle bar of figure abbreviation, etc. to cubic shape, it is the frame shape core box mounting base provided with predetermined rigidity, it is laid in a floor line, and stably holding is carried out.

[0029]The 1st and 2 tension grant rolls 4c and 4g. Where the tape 3 between the delivery reel 3A and the take up reel 3B is contacted, it is held at the attachment component of the figure abbreviation with which the base 2 was equipped so that reciprocation moving (reciprocation moving to the direction Z1 of outward moving and the direction Z2 of a backward movement which separates close to the 1st guidance roll 4b, the 2nd guidance roll 4d and the 3rd guidance roll 4f, and the 4th guidance roll 4h) is possible. The 1st and 2 tension grant rolls 4c and 4g are energized in said direction Z2 of a backward movement by the energizing member (tension spring) of figure abbreviation.

[0030]The guiding slit part 4e is what carries out stably holding to a horizontal state after the time of horizontal conveyance of the tape 3 by the intermittent driving part 5, and conveyance. It is arranged at the undersurface [ of the tape 3 ] (whole surface) 30, and upper surface (on the other hand) 31 side, consists of the two boards 40 and 41 by which fixed holding was carried out to said base 2 by the attachment component of the figure abbreviation connected with the vertical position of both ends, respectively, and has the slit 42 (refer to drawing 2) of the size which does not bar conveyance of the tape 3 of prescribed thickness.

[0031]The holding stand 5a of long shape with which the upper horizontal position of the base 2 was equipped with the intermittent driving part 5. It becomes the both ends of the movable carriage 5b which is slid to the transportation direction P1 of the tape 3, and its opposite direction P2, and carries out reciprocation moving in the state where it was held at the undersurface side of the holding stand 5a, and the movable carriage 5b from the 1st two clamp part 5c and the 2nd clamp part 5d which operate perpendicularly. The holding stand 5a is arranged along the transportation direction P1 of the tape 3, and fixed holding is carried out to the base 2 by the attachment component of figure abbreviation.

[0032]The movable carriage 5b is slid to said holding stand 5a, and is held so that reciprocation moving is possible. The 1st clamp part 5c and the 2nd clamp part 5d, The regular-position clamping plates 50c and 50d held at the attachment component of the figure abbreviation prolonged from said movable carriage 5a in the undersurface 30 side of the tape 3. Some interval is separated to the regular-position clamping plates 50c and 50d, a placed opposite is carried out to them, and it has the moving clamp boards 53c and 53d connected at the air cylinder 51c with which said movable carriage 5a was equipped, and piston axes [ which were held at 51 d so that up-and-down reciprocation moving was possible / 52c and 52d ] tip. Each regular-position

clamping plates 50c and 50d and each moving clamp boards 53c and 53d. The tape 3 can be clamped from the undersurface 30 and upper surface 31 side, a clamp state can be canceled, and also with the air cylinders 51c and 51d, it is constituted so that linkage with the reciprocation moving (the transportation direction P1 and its opposite direction P2 of the tape 3) of the movable carriage 5b is possible.

[0033]A commercial delivery unit can be used for said holding stand 5a. The heating apparatus 6 separates a predetermined interval to both sides of the tape 3, is arranged to them, and has the lower part heating plate 6a and the upper part heating plate 6b of symmetrical shape, respectively with two Naokata forms which carry out heat transfer in contact with the predetermined time tape 3. The lower part heating plate 6a and the upper part heating plate 6b are provided with the air cylinders 6c and 6d with which the base 2 was equipped by the attachment component of figure abbreviation, the air cylinder 6c, and the piston axes 6e and 6f by which the tip was connected with the lower part heating plate 6a and the upper part heating plate 6b while being held at 6 d so that up-and-down reciprocation moving was possible.

[0034]The lower part heating plate 6a and the upper part heating plate 6b are provided with the contact surfaces (heating surface) 60a and 60b (refer to drawing 2) which contact the tape 3, and can carry out reciprocation moving to said air cylinder 6c, the direction Y1 which approaches mutually by 6 d, Y2 and the direction Y3 from which it secedes, and Y4. The air cylinders 6c and 6d control the position of both the heating plates 6a and 6b. And while holding in the position which left the contact surfaces 60a and 60b about 10 mm on the undersurface 30 and upper surface 31 synchronizing with the time of conveyance of the tape 3 by the intermittent driving part 5, i.e., a noncontact state, Synchronizing with the time of the stop repeated the time of said conveyance, and by turns by the intermittent driving part 5, it can hold to the undersurface 30 and the upper surface 31, and a contact state.

[0035]The contact surfaces 60a and 60b are divided to six fields so that it may correspond to the six crevices 70 of the concave 7a in the hollow processing device 7 described later (refer to drawing 2). The lower part heating plate 6a and the upper part heating plate 6b contain the heater of the figure abbreviation which generates heat by impressing current to an inside. This heater adjustment and is controllable in 170 \*\* - 190 \*\* in the skin temperature of said contact surfaces 60a and 60b which contact each tape 3 of both the heating plates 6a and 6b. That is, said skin temperature should suit several kinds of the construction material of the tape 3 by setting up various applied current values.

[0036]While the hollow processing device 7 counters the undersurface 30 of the tape 3 heated by said heating apparatus 6 and is arranged, The concave 7a held at the position which synchronized at the time of conveyance of said intermittent driving part 5 and conveyance, and the stop repeated by turns, and is distant from the undersurface 30 of the tape 3, and which position [ the position ] and contacted so that reciprocation moving was possible. It consists of the pressurization part 7b which the upper surface 31 of the tape 3 is countered, and it is arranged, and is pressurized with application-of-pressure air toward the inside of said concave 7a.

[0037]As the concave 7a is shown in drawing 2, the crevice 71 of six hollow shape where processing is vertically as oblong as \*\*\*\*\* and the transportation direction P1 is mostly formed in the upper surface 70 with rectangular parallelepiped shape. The concave 7a consists of 7 d of piston axes by which the tip was connected with the concave 7a while being held at the air cylinder 7c (refer to drawing 1) with which the base 2 was equipped by the attachment component of figure abbreviation, and the air cylinder 7c so that up-and-down reciprocation moving is possible. The cushioning material 7e and the holding stand 7f which are shown in drawing 3 between said 7 d of piston axes are interposed, and the concave 7a is considered so that the hit at the time of the contact to the pressurization part 7b described via the concave tape 3 later may be eased.

[0038]It is open for free passage to the hole of the figure abbreviation which opens one end for free passage to the introduction passage 700 and the introduction passage 700 of the exhaust air for cooling which are supplied from the exhaust air cooling source of the figure abbreviation arranged outside, and the other end of this hole, and the derivation passage 701 which derives



the exhaust air after cooling the concave 7a is formed. The undersurface peripheral side 73 laid in said upper surface 71 peripheral side 72 of the concave 7a via the tape 3 as the pressurization part 7b is shown in drawing 2 and drawing 3. It is surrounded in the undersurface peripheral side 73, and consists of the presser-foot member 75 with the space part 74 which counters said crevice 71, the air passage 76 linked to the space part 74, and a pressure source (compressor) of the figure abbreviation linked to the air passage 76.

[0039]The sending hole processing device 8 is a thing using the same press die as the former, and as shown in drawing 1, counter the undersurface 30 side of the tape 3 and it is arranged. The female die 80 with many holes of the figure abbreviation which separated the interval of the prescribed width along with the side part of a tape, and was arranged to two rows. The upper surface 31 side of the tape 3 is countered, and it is arranged, and many pins of the figure abbreviation provided in many holes of said female die 80 enabling respectively free frequent appearance also serve as ~~\*\*\*\*~~ 81 more, are sent out to the side part of the tape 3 at equal intervals along said transportation direction P1, and form the hole 33 (refer to drawing 2). The female die 80 is connected at the tip of the piston axis 8b of the air cylinder 8a with which the base 2 was equipped so that linkage is possible, and the base 2 is equipped with the male 81 via the attachment component of figure abbreviation.

[0040]It has the regular-position clamping plate 52e held at the attachment component of the figure abbreviation which the 3rd clamp part 5e describes above, is installed in the back side from the 2nd clamp part 5c, and is prolonged by said base 2. And it is the same composition as the 1st clamp part 5c and the 2nd clamp part 5d except operating in the state contrary to said case at the time of a releasing clamp and a clamp at the time of the clamp of the tape 3 by said 1st clamp part 5c and the 2nd clamp part 5d, and a releasing clamp (unclamping).

[0041]Synchronizing with movement to the transportation direction P1 of the tape 3 of the movable carriage 5b of said intermittent driving part 5, the driving shaft 4i is connected with the motor of the figure abbreviation rotated with a rotation almost equal to the movement magnitude so that linkage is possible. The example which manufactures an embossed carrier tape using the molding equipment 1 of the resin tape of Example 1 constituted as mentioned above is explained below.

[0042]First, as preparation which precedes shifting to the automatic operation operation of the molding equipment 1 of a resin tape beforehand. While the tape 3 of the delivery reel 3A is drawn out by a part for predetermined length, and hand control and making it engage with the 1st guidance roll 4b, the 1st tension grant roll 4c, and the 2nd guidance roll 4d. The 1st clamp part 5c in a non clamp state, the guiding slit part 4e, the heating apparatus 6 in the state where it opened wide, respectively, the hollow processing device 7, the sending hole processing device 8, the 2nd clamp part 5d in a non clamp state, the 4th guidance roll 4h passes, and the 3rd clamp part 5e, the 3rd guidance roll 4f, and 4 g of the 2nd tension grant rolls stop to the take up reel 3B.

[0043]Subsequently, if it is made to shift at the time of automatic operation of the molding equipment 1 of a resin tape, the 1st clamp part 5c of the intermittent driving part 5 and the 2nd clamp part 5d, the heating apparatus 6, the hollow processing device 7, the sending hole processing device 8, the 3rd clamp part 5e, and the driving shaft 4i will synchronize, and it will operate, respectively. And the tape 3 which conveyance and a conveyance stop were repeated by turns by the intermittent driving part 5, and was sent out from the delivery reel 3A at the time of operation of the molding equipment 1 of a resin tape. The 1st and 2 tension grant roll 4c and a tension predetermined [ 4 g ] are given in the middle of the conveying path which results in the take up reel 3B. For this reason, the tape 3 has it prevented to slacken between the delivery reel 3A and the take up reel 3B, and can perform eye a position certainly in each field of the heating apparatus 6, the hollow processing device 7, and the sending hole processing device 8.

[0044]First said tape 3 here Each regular-position clamping plates 50c and 50d of the 1st clamp part 5c and the 2nd clamp part 5d, it is clamped with the moving clamp boards 53c and 53d interlocked with piston axes [ by each air cylinders 51c and 51d / 52c and 52d ] outward moving (arrow Y2 reference of drawing 1) (refer to the clamp location of the broken chain line shown by

the arrow S1 of drawing 5). It can come, simultaneously the 3rd clamp part 5e will be in a non clamp state with the regular-position clamping plate 50e and the moving clamp board 53e, interlocked with the backward movement (arrow Y1 reference of drawing 1) of the piston axis 52e by the air cylinder 51e (refer to drawing 5).

[0045] The movable carriage 5b carries out outward moving to the transportation direction P1 in this state (refer to the position after movement shown according to the two-dot chain line shown by the arrow S2 of drawing 5). The heating object area part which the tape 3 was conveyed in connection with this in the transportation direction P1, and passed the guiding slit part 4e, respectively to the field of the heating apparatus 6. The heated area part located in the field of the heating apparatus 6 until now becomes depressed, and to the field of the processing device 7. The area part processed [ sending hole ] after the area part processed [ hollow ] after being processed with the hollow processing device 7 was processed with the sending hole processing device 8 to the field of the sending hole processing device 8 is conveyed to the take-up-reel 3B side.

[0046] And the 3rd clamp part 5e, the 1st clamp part 5c, and the 2nd clamp part 5d operate. The 3rd clamp part 5e is clamped with the regular-position clamping plate 50e and the moving clamp board 53e interlocked with the outward moving (arrow Y2 reference of drawing 1) of the piston axis 52e by the air cylinder 51e (refer to drawing 6). Can come and Simultaneously, the regular-position clamping plates 50c and 50d of the 1st clamp part 5c and the 2nd clamp part 5d, The moving clamp board 53c interlocked with a piston axes [ by each air cylinders 51c and 51d / 52c and 52d ] backward movement (arrow Y2 reference of drawing 1), In 53 d, it will be in a non clamp state, the movable carriage 5b carries out a backward movement to the transportation direction P2 and the opposite direction P2 in this state, it returns to the original position (refer to the position after movement shown according to the two-dot chain line of drawing 6), and fixed time maintenance of this state is carried out.

[0047] The air cylinders 6c and 6d of the heating apparatus 6 are operated between said fixed time, and outward moving of the lower part heating plate 6a and the upper part heating plate 6b which were heated by predetermined temperature is carried out, respectively (the arrow Y1 of drawing 6, Y2 reference). And the contact surfaces 60a and 60b are made to contact the undersurface 30 of the heating object area part of the tape 3, and the upper surface 31, and the heated area part heated and softened in the range of 170 °C - 190 °C is obtained.

[0048] On the other hand, in the hollow processing device 7, the air cylinder 7c is operated, outward moving (arrow Y1 reference of drawing 6) of the concave 7a is carried out, and the undersurface 30 of the heated area part of the tape 3 heated by the range of said temperature is contacted, and it presses and pinches by the presser-foot member 75 installed in the upper surface 31 side of a heated area part. Then, the upper surface 31 of the tape 3 is surrounded in the undersurface side peripheral side 73 of the presser-foot member 75, and the space part 74 which counters said crevice 71 is held airtightly. The application-of-pressure air of 5 kg/cm<sup>2</sup> - 9 kg/cm<sup>2</sup> is supplied to the space part 74 by the air passage 76 from the pressure source of figure abbreviation in this state, and it pressurizes toward said each crevice 71 of the concave 7a from the upper surface 30 of the tape 3.

[0049] Then, said softened heated area part, While changing toward the space of each crevice 71 of the concave 7a according to the energizing force by said application of pressure, Plastic working is carried out along with the shape of each crevice 71, and it becomes depressed, and 32 is formed, and at the moment, the surface of the crevice 71 controlled by temperature lower than the temperature is contacted, and the hollow 32 is cooled and fixed to the shape made into the purpose. Thus, since hollow 32 shape after said plastic working is not influenced by heat which breaks down or changes said shape from each crevice 71 even if it contacts each crevice 71, it does not carry out heat modification but can hold the target dimensional accuracy. The new heating object area part of the tape 3 which is in a halt condition in heating apparatus 6 position simultaneously with the method of - and this is heated by the heating apparatus 6, and is softened.

[0050] As opposed to the tape 3 in which it became depressed with said hollow processing device.

7, and 32 was formed in the sending hole processing device 8. The air cylinder 8c is operated, the male 81 and the female die 80 are made into a mold closing state, and the sending hole 33 of a large number which separated the interval of the prescribed width along with the side part of the tape 3, and were arranged to two rows is formed at equal intervals along the transportation direction P1. Then, as for the 3rd clamp part 5e, the 3rd guidance roll 4f, and 4 g of the 2nd tension grant rolls, the tape 3 is 4th guidance roll 4h Passed, and is rolled round by the take up reel 3B, and use is presented with it.

[0051] According to the molding equipment 1 of the resin tape of Example 1, only the concave 7a that turns into what is called a female die as a die for forming many hollows 32 of the shape used as the tape 3 with the purpose is required, and a female die and a male are not needed like the conventional press device. for this reason, the facility cost of a die — about [ said / conventional ] — it can decrease to one fourth. When becoming depressed on the tape 3 and carrying out plastic shaping of 32, like the conventional press device, In order do not pinch in an instant mechanically with a female die and a male, but to pressurize flexibly the tape 3 which was beforehand heated with the heating apparatus 6 and was softened by a pressurized air, and to carry out plastic working, to become depressed along with the shape of each crevice 71 of the concave 7a and to obtain 32, Unreasonableness does not start each crevice 71 of the concave 7a, and the molding part of the undersurface 30 of the tape 3, and the upper surface 31.

[0052] Therefore, even if the concave 7a is long-term use, it does not have the fall of the mold accuracy by said consumption [ exhausting / and / by contact with the tape 3 energized by the pressurized air ]. It is hard to attach a crack to the die surface of the hollow 32 of the tape 3, and the yield of a product is high. For this reason, there is no \*\*, without also being able to make the hollow 32 into deep-drawing shape, and being limited to shaping of the hollow of the shallow diaphragm shape by the conventional press device. since it is cooled by said temperature requirement from which it sees \*\* 32 and shape does not start heat modification even if it sees \*\* 32 and shape contacts, the concave 7a can improve the yield of the hollow 32.

[0053] At the time of operation of the molding equipment 1 of a resin tape, the tape 3 is 1st and 2 tension grant rolled 4c, and is given a predetermined tension by 4 g. For this reason, slackening between the delivery reel 3A and the take up reel 3B needs to be prevented, eye a position can be certainly performed in each field of the heating apparatus 6, the hollow processing device 7, and the sending hole processing device 8, and it is not necessary to fall product precision.

[0054] The undersurface 30 and the upper surface 31 of the tape 3 sent out to the heating apparatus 6, the hollow processing device 7, and the sending hole processing device 8 from the delivery reel 3A during operation of the molding equipment 1 of a resin tape. Since said each devices 6, 7, and 8 are contacted only at the time of the conveyance stop of the intermittent driving part 5 and it is made non-contact at the time of conveyance of the intermittent driving part 5, generating of the crack by conveyance can be reduced.

[0055] The molding equipment 1 whole can be miniaturized compared with the conventional thing. In this case, in the production line which carries out like impression plaster, for example since [ which becomes depressed and accommodates precision electronic components, precision autoparts, etc. of figure abbreviation in 32 ] it was formed in the tape 3, Following on the process of in-line-ization of which installs the molding equipment 1 being attained, and becoming depressed on the tape 3 with the molding equipment 1, and forming 32, one production line can perform like the impression plaster which attaches said part to the hollow 32.

[0056] (Example 2) Example 2 of the molding equipment of this invention and a resin tape is described based on drawing 7 - drawing 20. The molding equipment 1A of the resin tape of Example 2 shown in drawing 7. The heating apparatus 6B and the hollow processing device 7B were used instead of the heating apparatus 6 in the molding equipment 1 of the resin tape of said Example 1, and the hollow processing device 7. It is the same as the composition of the molding equipment 1 of the resin tape of Example 1 except not installing the sending hole processing device 8 of Example 1 in it in order, while installing the 1st punching device 9 and the 2nd punching device 10 in the next of the hollow processing device 7B.

[0057] Therefore, the same numerals are given to the same portion as the composition of the molding equipment 1 of the resin tape of Example 1, and the explanation is omitted. The disc-like

parts 32A provided with drawing 11 and the hollow 32a shown in 12 by the product made of resin using the width 24 [ about ], 5 mm, the thickness 0, 1-0, and the 5-mm tape 3a as the molding equipment 1A of a resin tape, When manufacturing simultaneously two kinds of the disc-like parts 32B provided with drawing 13 and the hollow 32b shown in 14 every two pieces each, it applies and explains.

[0058] The parts 32A have circular plane shape, and The upper bed part 320 of ring shape, The major-diameter peripheral wall part 322 formed in the predetermined depth position from the upper surface 321 of the upper bed part 320, The level wall 323 of the ring shape which lengthened width from the major-diameter peripheral wall part 322 to the central direction horizontally, It consists of the byway peripheral wall part 324 formed in the predetermined depth from the inner periphery end of the level wall 323, and the bottom wall part 327a of the ring shape which has the long hole-shaped feed hole 325a while lengthening width from the byway peripheral wall part 324 to a central direction. Said shape and the depth, width, a diameter, an aperture, the height from the outer bottom surface 328 of the bottom wall part 327a to the upper surface 321 of the upper bed part 320, etc. can be variously set up according to the purpose.

[0059] The parts 32B have circular plane shape, and The upper bed part 320 of ring shape, The major-diameter peripheral wall part 322 formed in the predetermined depth position from the upper surface 321 of the upper bed part 320, The level wall 323 of the ring shape which lengthened width from the major-diameter peripheral wall part 322 to the central direction horizontally, The byway peripheral wall part 324 formed in the predetermined depth from the inner periphery end of the level wall 323, Width is extended from the byway peripheral wall part 324 to a central direction, and it consists of the bottom wall part 327b of ring shape with the two circular long holes 326b which separated the interval (regular intervals) to the circumferential direction of the long hole-shaped feed hole 325b and the feed hole 325b, and have been mutually arranged with \*\*\*\* in the opposed position. Said shape and the depth, width, a diameter, an aperture, the height from the outer bottom surface 328 of the bottom wall part 327b to the upper surface 321 of the upper bed part 320, etc. can be variously set up according to the purpose.

[0060] Said parts 32A and 32B are in the state with which one end and the other end of the film for photography which were wound around predetermined length were equipped, for example, with said film, are accommodated in a protective case and used. The heating apparatus 6B is divided to four fields, as shown in drawing 10, It is the same composition as the heating apparatus 6 of Example 1 except having lower part heating plate 6g \*\*\*\* provided with 60 g of almost circular contact surfaces (heating surface) which contact the undersurface 30 and the upper surface 31 of the tape 3a which are in a conveyance stop state temporarily, and the upper part heating plate 60h provided with 60 h of contact surfaces (heating surface).

[0061] The hollow processing device 7B is the same composition as the hollow processing device 7 of Example 1 except having 7 g of concaves by which the crevices 710, 711, 711, and 710 of four almost circular hollow shape arranged in order were formed in the longitudinal direction. The crevices 710 and 711 are the almost same shape. The pars-basilaris-ossis-occipitalis hole dawn concave 90 and the pars-basilaris-ossis-occipitalis hole dawn convex shape 91 which carry out relative displacement to the position which the base 2 was equipped with the 1st punching device 9 by the attachment component of figure abbreviation as shown in drawing 7, and separated approach and a predetermined interval mutually via the tape 3a, While consisting of a - pair provided in the position which counters, respectively and being held at the air cylinder 9a and the air cylinder 9a so that reciprocation moving is possible in order [ said ] to carry out relative displacement, the pars-basilaris-ossis-occipitalis hole dawn concave 90 and the pars-basilaris-ossis-occipitalis hole dawn convex shape 91, A tip consists of the piston axis 9b connected with the toggle mechanism 9c.

[0062] The pars-basilaris-ossis-occipitalis hole dawn concave 90 and the pars-basilaris-ossis-occipitalis hole dawn convex shape 91, While separating a predetermined interval on the undersurface and the upper surface of the tape 3a, being arranged and pinching predetermined time and the tape 3a, It is the thing which was formed in the tape 3a four in order by said

processing device 7B at the longitudinal direction and which it becomes depressed and carries out hole down to predetermined shape at each pars basilaris ossis occipitalis of 32a, 32b, 32b, and 32a (refer to 7 area Bs of drawing 15). The reason which arranges said four hollows 32a, 32b, 32b, and 32a to the longitudinal direction of the tape 3a in order, and was formed in it is for securing balance so that it can hold to the value aiming at process tolerance with the hollows 32a and 32b which form the breakthrough of different shape inside.

[0063] That is, as shown in 9 area Bs of drawing 15, the long hole-shaped feed hole 325a is formed in the bottom wall part 327a of the hollow 32a, and the long hole-shaped feed hole 325b and the two circular long holes 326b are formed in the bottom wall part 327b of the hollow 32b. The pars-basilaris-ossis-occipitalis hole down concave 90 is provided with the dies 92 (refer to drawing 16), 93 (refer to drawing 17), 93, and 92 of four hollow shape which carries out housing and holding of the hollows 32a, 32b, 32b, and 32a of four circle configurations formed in order by said hollow processing device 7B as it is. The die 92 has the mold cavity 920 for long hole-shaped feed-hole downs. The die 93 has the mold cavity 930 for long hole-shaped feed-hole downs, and the two mold cavities 931 and 931 for circular long hole downs. Said dies 92 and 93 are fixed and held at the bottom part base 98, respectively.

[0064] The pars-basilaris-ossis-occipitalis hole down convex shape 91 is provided with the punches 94, 95, 95, and 94 in which reciprocation moving is possible via the hollows 32a, 32b, 32b, and 32a of said tape 3a corresponding to the dies 92, 93, 93, and 92 pars-basilaris-ossis-occipitalis hole down concave [said / 90], respectively. the hole which makes possible reciprocation moving of the \*\*\*\* of the punch 94 (refer to drawing 16) at the tip in the mold cavity 920 of the die 92 — it has the dawn projected part 940.

[0065] the hole which makes respectively possible reciprocation moving of the \*\*\*\* of the punch 95 (refer to drawing 17) at the tip in the mold cavity 930 and the mold cavity 931 of the die 93 — it has the dawn projected parts 950 and 951. Said punches 94 and 95 are fixed and held at the punch base 99, respectively. The strip artists 96 and 97 for pinching the tape 3a with the dies 92, 93, 93, and 92, and carrying out position immobilization, just before the punches 94 and 95 act to the circumference of the punches 94 and 95 as Kung-Ming of the hollows 32a, 32b, 32b, and 32a of the tape 3a are stationed.

[0066] The base 2 is equipped with drawing 7 and the 2nd punching device 10 shown in 20 by the attachment component of figure abbreviation. It is the same composition as said said 1st punching device 9 except having used the punching concave 100 and the punching convex shape 110 which carry out relative displacement to the position which separated approach and a predetermined interval mutually via the tape 3a. The punching concave 100 and the punching convex shape 110 are for piercing the hollows 32a, 32b, 32b, and 32a of four circle configurations shown in nine fields of drawing 15 from the tape 3a as the four parts 32A, 32B, 32B, and 32A, as shown in ten fields of drawing 15.

[0067] As a driving means which carries out relative displacement of the punching concave 100 and the punching convex shape 110, while being held at the air cylinder 9a shown in drawing 20, and the air cylinder 9a so that reciprocation moving is possible, the piston axis 9b by which the tip was connected with the toggle mechanism 9c is used. Comparatively big thrust is efficiently obtained in few spaces by adopting said toggle mechanism 9c.

[0068] It pierces with the punching concave 100 and is almost the same as said pars-basilaris-ossis-occipitalis hole down concave 90 and the pars-basilaris-ossis-occipitalis hole down convex shape 91 except the convex shape 110 being the shape set as the clearance which can obtain said shearing action both these types of in between. The punching concave 100 is provided with the four dies 101, 102, 102, and 101 arranged in order by the longitudinal direction (refer to drawing 20). The dies 101 and 102 (drawing 18, 19 references) have the holes 101a and 102a which were formed in the tape 3a and which become depressed and accommodate 32a and 32b, and are fixed and held at the bottom part base 103.

[0069] The punching convex shape 110 is provided with the tubed heights 111, 112, 112, and 111 which form the clearance which can obtain a shearing action with said dies 101, 102, 102, and 101 (refer to drawing 20). Said tubed punches 111 and 112 (drawing 18, 19 references) are fixed and held at the punch base 113, respectively. In the inner circumference side of the tubed

punches 111 and 112. The heights 114 and 115 for a guide which it is inserted in the feed-hole 325a hole of the hollow 32a and the feed-hole 325b hole of the hollow 32b, respectively just before the tubed punches 111 and 112 perform the shearing action of the tape 3a, and are made into a positioning reference are formed.

[0070]The parts 32A and 32B pierced from the tape 3a after, as for said heights 113 and 114 for a guide, the feed-hole 325a hole of the hollow 32a and the feed hole 325b of the hollow 32b had got into the peripheral face. In order to spout the compressed air for making it break away caudad toward said hollows 32a and 32b from the holes 101a and 102a of the dies 101 and 102. It has two or more hole shape or grooved jet holes 111b and 112b which were allocated in the periphery side near the tubed punches 111 and 112, or the peripheral face at equal intervals by the circumferencial direction.

[0071]It connects with the pressure source (compressor) of figure abbreviation, and said jet holes 111b and 112b are controlled by the pressure of  $5 \text{ kg/cm}^2 - 8 \text{ kg/cm}^2$ . As preparation which precedes shifting to the automatic operation operation of the molding equipment 1A of the resin tape using the tape manufacturing installation of Example 2 constituted as mentioned above, beforehand, While the tape 3a of the delivery reel 3A is drawn out by a part for predetermined length, and hand control and making it engage with the 1st guidance roll 4b, the 1st tension grant roll 4c, and the 2nd guidance roll 4d, The 1st clamp part 5c in a non clamp state, the guiding slit part 4e, the heating apparatus 6B in the state where it opened wide, respectively, It 4th guidance roll 4h Passes, and the hollow processing device 7B, the 1st punching device 9, the 2nd punching device 10, the 2nd clamp part 5d in a non clamp state, the 3rd clamp part 5e, the 3rd guidance roll 4f, and 4 g of the 2nd tension grant rolls stop to the take up reel 3B.

[0072]Subsequently, if it is made to shift at the time of automatic operation of the molding equipment 1 of a resin tape, the 1st clamp part 5c of the intermittent driving part 5 and the 2nd clamp part 5d, the heating apparatus 6B, the hollow processing device 7B, the 1st punching device 9, the 2nd punching device 10, the 3rd clamp part 5e, and the driving shaft 4i will synchronize, and it will operate, respectively, And the tape 3a which conveyance and a conveyance stop were repeated by turns by the intermittent driving part 5, and was sent out from the delivery reel 3A at the time of operation of the molding equipment 1 of a resin tape, The 1st and 2 tension grant roll 4c and a tension predetermined [ 4 g ] are given in the middle of the conveying path which results in the take up reel 3B. For this reason, the tape 3a has it prevented to slacken between the delivery reel 3A and the take up reel 3B, and positioning can be ensured it in each field of the heating apparatus 6B, the hollow processing device 7B, the 1st punching device 9, and the 2nd punching device 10.

[0073]First said tape 3a here Each regular-position clamping plates 50c and 50d of the 1st clamp part 5c and the 2nd clamp part 5d, It is clamped with the moving clamp boards 53c and 53d interlocked with piston axes [ by each air cylinders 51c and 51d / 52c and 52d ] outward moving (arrow Y2 reference of drawing 7) (refer to the clamp location of the broken chain line shown by the arrow S1 of drawing 8). It can come, simultaneously the 3rd clamp part 5e will be in a non clamp state with the regular-position clamping plate 50e and the moving clamp board 53e interlocked with the backward movement (arrow Y1 reference of drawing 7) of the piston axis 52e by the air cylinder 51e (refer to drawing 8).

[0074]The movable carriage 5b carries out outward moving to the transportation direction P1 in this state (refer to the position after movement shown according to the two-dot chain line shown by the arrow S2 of drawing 8). The heating object area part which the tape 3a was conveyed in connection with this in the transportation direction P1, and passed the guiding slit part 4e, respectively to the field of the heating apparatus 6B. The heated area part located in the field of the heating apparatus 6B until now becomes depressed, and to the field of the processing device 7B. The area part processed [ hollow ] after being processed with the hollow processing device 7B sends out, and to the field of the 1st punching device 9. The area part [ the area part processed / pars-basilaris-ossis-occipitalis hole dawn / after being processed with the 1st punching device 9 ] processed [ by which punching was carried out in the parts 32A

and 32B with the 2nd punching device 10 to 2nd punching device 10 field ] is conveyed to the take-up-reel 3B side.

[0075] And the 3rd clamp part 5e, the 1st clamp part 5c, and the 2nd clamp part 5d operate. The 3rd clamp part 5e is clamped with the regular-position clamping plate 50e and the moving clamp board 53e interlocked with the outward moving (arrow Y2 reference of drawing 7) of the piston axis 52e by the air cylinder 51e (refer to drawing 9). Can come and Simultaneously, the regular-position clamping plates 50c and 50d of the 1st clamp part 5c and the 2nd clamp part 5d, The moving clamp board 53c interlocked with a piston axes [ by each air cylinders 51c and 51d / 52c and 52d ] backward movement (arrow Y2 reference of drawing 7). In 53 d, it will be in a non clamp state, the movable carriage 5b carries out a backward movement to the transportation direction P2 and the opposite direction P2 in this state, it returns to the original position (refer to the position after movement shown according to the two-dot chain line of drawing 9), and fixed time maintenance of this state is carried out.

[0076] The air cylinders 6c and 6d of the heating apparatus 6B are operated between said fixed time, and outward moving of the lower part heating plate 6g and the upper part heating plate 6h which were heated by predetermined temperature is carried out, respectively (the arrow Y1 of drawing 9, Y2 reference). And the contact surfaces 60g and 60h are made to contact the undersurface 30 of the heating object area part of the tape 3a, and the upper surface 31, and the heated area part heated and softened in the range of 170 \*\* - 190 \*\* is obtained.

[0077] On the other hand, with the hollow processing device 7B, operate the air cylinder 7c and outward moving (arrow Y1 reference of drawing 10) of the concave seven a1 is carried out. The undersurface 30 of the heated area part of the tape 3a heated by the range of said temperature is contacted, and it presses and pinches by the presser-foot member 75 installed in the upper surface 31 side of a heated area part. And the upper surface 31 of the tape 3a is surrounded in the undersurface side peripheral side 73 of the presser-foot member 75, and the space part 74 which counters said crevices 710, 711, 711, and 710 is held airtightly. The application-of-pressure air of specified pressure is supplied to the space part 74 by the air passage 76 from the pressure source of figure abbreviation in this state, and it pressurizes toward said each crevices 710 and 711 of the concave seven a1 from the upper surface 30 of the tape 3a.

[0078] Then, said softened heated area part, Plastic working is carried out along with the shape of each crevices 710 and 711 of the concave seven a1 cooled by predetermined temperature, become depressed, and 32a, 32b is formed, and since the moment and a hollow contact the surface of each crevices 710 and 711 controlled by temperature lower than the temperature, heat modification of the shape after plastic working is not carried out, and the target dimensional accuracy can be held. The new heating object area part of the tape 3a which is in a halt condition in a heating apparatus 6B position simultaneously with the method of - and this is heated by the heating apparatus 6B, and is softened.

[0079] The hollow 32a shown in drawing 15 with said hollow processing device 7B in the 1st punching device 9, To the tape 3a in which 32b was formed, the actuation load of the piston axis 9b by the air cylinder 9a to drive is transmitted to the pars-basilaris-ossis-occipitalis hole dawn concave 90 and the pars-basilaris-ossis-occipitalis hole dawn convex shape 91 via the toggle mechanism 9c, and it is considered as a mold closing state (refer to drawing 9). Then, the heights 94, 95, 95, and 94 of the pars-basilaris-ossis-occipitalis hole dawn convex shape 91 rush in into the hollows 32a, 32b, and 32b of four circle configurations of the tape 3a by which housing and holding was carried out to the crevices 92, 93, 93, and 92 of the pars-basilaris-ossis-occipitalis hole dawn concave 90, and 32a.

[0080] And the long hole-shaped feed hole 325a is formed in the bottom wall part 327a of the hollow 32a in the projected part 940 of the heights 94, and the mold cavity 920 of the crevice 92, the hole of the heights 95 — it becomes depressed in the dawn projected part 951 and the mold cavity 931 of the crevice 93, and the long hole-shaped feed hole 325b is formed in the bottom wall part 327b of 32b. further — the hole of the heights 95 — it becomes depressed in the dawn projected part 952 and the mold cavity 932 of the crevice 93, and the two circular long holes 326b are formed in the bottom wall part 327b of 32b.

[0081] becoming depressed with the 1st punching device 9 in the 2nd punching device 10 — 327b

of the bottom wall part 327a of 32a, and the hollow 32b — a hole, after dawn processing is made, To the tape 3a, the actuation load of the piston axis 9b by the air cylinder 9a to drive is pierced via the toggle mechanism 9c, and it transmits to the concave 100 and the punching convex shape 110, and is considered as a mold closing state.

[0082]Then, the tubed heights 111, 112, 112, and 111 of the convex shape 110 rush in into the hollows 32a, 32b, and 32b of four circle configurations of the tape 3a by which housing and holding was carried out to the crevices 101, 102, 102, and 101 of the punching concave 100, and 32a. At this time, the heights 114 for a guide by the side of the inner circumference of the tubed heights 111 are inserted in the feed-hole 325a hole of the hollow 32a, and become depressed considering a feed-hole 325a hole as a positioning reference, and coincide 32a with a punching position. The heights 115 for a guide by the side of the inner circumference of the tubed heights 112 are inserted in the feed hole 325b of the hollow 32b, and become depressed considering the feed hole 325b as a positioning reference, and coincide 32b with a punching position.

[0083]By subsequently, the crevices 101, 102, 102, and 101 of the punching concave 100 which counter and carry out relative displacement via said hollows 32a, 32b, 32b, and 32a and the tubed heights 111, 112, 112, and 111 of the convex shape 110. The tape 3a receives a shearing action and the two parts 32A with the hollow 32a and the two parts 32B with the hollow 32b are clipped.

[0084]When the tubed heights 111, 112, 112, and 111 of the convex shape 110 pierce the clipped parts 32A and 32B, they escape from the crevices 101, 102, 102, and 101 of the concave 100 and it comes out. To the hollow 32a with the feed hole 325a in the state where it fitted into the heights 114 for a guide, and the hollow 32b with the feed hole 325b in the state where it fitted into the heights 115 for a guide, when compressed air blows off from the jet hole 116, it breaks away caudad from the crevices 101 and 102 of the mold 100.

[0085]On the other hand, as for the 3rd clamp part 5e, the 3rd guidance roll 4f, and 4 g of the 2nd tension grant rolls, the tape 3a after the parts 32A and 32B were clipped after this is 4th guidance roll 4h Passed, and is rolled round and processed by the take up reel 3B. According to the molding equipment 1A of the resin tape of Example 2, the hollow 32a of plurality [ tape / 3a ], Since the tape 3a which was beforehand heated with the heating apparatus 6B at the time of shaping of 32b, and was softened is flexibly pressurized by a pressurized air and plastic working is carried out along with the shape of each crevices 710 and 711 of 7 h of concaves, Unreasonableness does not start the molding part of each crevices 710 and 711 of 7 h of concaves and the undersurface 30 of the tape 3a, and the upper surface 31.

[0086]Therefore, even if 7 h of concaves are long-term use, they do not have the fall of the mold accuracy by said consumption [ exhausting / and / by contact with the tape 3a energized by the pressurized air ]. It is hard to attach a crack to the die surface of the hollows 32a and 32b of the tape 3a, and the yield of a product is high. For this reason, there is no \*\*, without also being able to make the hollows 32a and 32b into deep-drawing shape, and being limited to shaping of the hollow of the shallow diaphragm shape by the conventional press device. Since 7 g of concaves are cooled to the temperature which does not carry out heat modification even if the tape 3a contacts, it can prevent becoming what becomes depressed and differs in 32a and 32b from the formed target shape, and the yield can be improved.

[0087]Thus, the almost same effect as the case of Example 1 is acquired, and also the independent parts of a large number from which shape differs (two or more kinds) can be continuously fabricated with an identical material from the tape 3a.

[0088]

[Effect]According to the molding equipment of the resin tape of claim 1, only a female die is required as a die for forming many hollows of the shape used as the resin tape of (1) long shape with the purpose, and a female die and a male are not needed like the conventional press device. for this reason, the facility cost of a die — about [ said / conventional ] — it can decrease to one fourth and a reduction effect shows up further in a complicated metaplasia form type. (2) When carrying out plastic shaping of the hollow to the resin tape of long shape, like the conventional press device, In order to pressurize flexibly the tape which was not pinched in an instant mechanically, but was heated beforehand, and was made soft with the female die and the



male by hydrostatic pressure and to carry out plastic shaping along with a female die once, unreasonableness does not start the die surface (both-sides side) of a female die and said tape. [0089]Therefore, there is no fall of the mold accuracy by said consumption [ exhausting / and / by rubbing against a male via a tape, even if a female die is long-term use ]. It is hard to attach a crack to the die surface of a tape, and the yield of a product is high. For this reason, width spreads in shaping of deep-drawing shape or odd shape, without being able to form deep-drawing-shaped a hollow and a complicated variant hollow and being limited to shaping of the hollow of shallow diaphragm shape, or the hollow of simple shape.

(3) It is low-cost and long-term use also has a low rate [ exhausting ] of a female die, it can be stabilized over a long period of time, a crack cannot take [ a male is not needed, ] lessons for mold accuracy from the die surface of a tape easily, and a high product yield can be obtained.

(4) The whole molding equipment can be miniaturized compared with the conventional thing. [0090]According to the molding equipment of the resin tape of claim 8, can acquire the almost same effect as the case of the molding equipment of the resin tape of the above (2), and also. Since the punching device which pierces the portion by which was located behind heating apparatus and a processing device, and plastic working was carried out at the time of a stop is provided, it is separated from the resin tape of long shape, and closed-end parts with \*\* which formed the hole in the pars basilaris ossis occipitalis can be obtained, for example.

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[Translation done.]

**\* NOTICES \***

JPO and INPIT are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

**[Drawing 1]**The schematic diagram showing the important section in the molding equipment of the resin tape of Example 1, and its system.

**[Drawing 2]**The perspective view showing those arrangement relationship while the resin tape of the long shape which is the intermittent driving part, the heating apparatus, processing device, and processing object which constitute the molding equipment of the resin tape of drawing 1 is shown.

**[Drawing 3]**The sectional view showing the resin tape of the long shape in drawing 2, and the bottom part and pressurization part of a processing device which have been arranged at the both-sides side.

**[Drawing 4]**The sectional view showing the state where the hollow in which electronic parts are accommodated was formed in the resin tape of long shape by the bottom part and pressurization part of a processing device in drawing 3.

**[Drawing 5]**The schematic diagram showing the operating state of the intermittent driving part of the molding equipment of the resin tape in drawing 1.

**[Drawing 6]**The schematic diagram showing the operating state of the heating apparatus of the molding equipment of the resin tape in drawing 1, and a processing device.

**[Drawing 7]**The schematic diagram showing the system of the molding equipment of the resin tape of Example 2.

**[Drawing 8]**The schematic diagram showing the operating state of the intermittent driving part in drawing 7.

**[Drawing 9]**The schematic diagram showing the operating state of the heating apparatus in drawing 7, and a processing device.

**[Drawing 10]**The perspective view showing those arrangement relationship while the resin tape of the long shape which is the heating apparatus in drawing 7, a processing device, and a processing object is shown.

**[Drawing 11]**The top view in which having manufactured while and showing parts in Example 2.

**[Drawing 12]**The A-A line section view figure in drawing 11.

**[Drawing 13]**The top view of the parts of another side manufactured in Example 2.

**[Drawing 14]**The B-B line section view figure in drawing 13.

**[Drawing 15]**The perspective view showing the processing condition of the tape in the field by the processing device in Example 2, the field by the 1st punching device, and the field by the 2nd punching device.

**[Drawing 16]**The sectional view showing the pars-basilaris-ossis-occipitalis hole dawn concave of the 1st punching device and pars-basilaris-ossis-occipitalis hole dawn convex shape in drawing 11 which carry out hole dawn processing of the parts.

**[Drawing 17]**The sectional view showing the pars-basilaris-ossis-occipitalis hole dawn concave of the 1st punching device and pars-basilaris-ossis-occipitalis hole dawn convex shape which carry out hole dawn processing of the parts of another side in drawing 13.

**[Drawing 18]**The sectional view showing the mold opening state of the 2nd punching device.

**[Drawing 19]**The sectional view showing the mold closing state of the 2nd punching device.

[Drawing 20] The sectional view showing the 2nd punching device.

[Description of Notations]

1 1A --- Molding equipment of a resin tape 2 --- Base 3 --- Resin tape of long shape  
3A --- Delivery reel 3B --- Take up reel  
32A, 32B --- Parts 32, 32a, 32b --- Hollow  
4a --- Maintenance pivot 4b --- The 1st guidance roll 4c --- The 1st tension grant roll  
4d --- The 2nd guidance roll 4e --- Guiding slit part 4f --- The 3rd guidance roll  
4g --- The 2nd tension grant roll  
5 --- Intermittent driving part  
6 6B --- Heating apparatus 6a, 6b --- Lower part heating plate 6b, 61 --- Upper part heating plate  
7 7B --- Processing device 9 --- The 1st punching device 10 --- The 2nd punching device

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[Translation done.]